

A Review of the 308-nm Excimer Laser in the Treatment of Psoriasis

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The 308-nm excimer laser is a new modality for the treatment of psoriasis. With the 308-nm UVB radiation generated by this laser, it is possible to clear psoriasis with as little as one treatment and to have a moderately long remission. In contrast to traditional phototherapy techniques, this handheld excimer laser UVB therapy is selectively directed toward lesional skin, thus sparing the surrounding normal skin from unnecessary radiation exposure. This modality may offer a new alternative in the treatment of limited psoriasis and other inflammatory diseases.

Ultraviolet phototherapy has been a mainstay in the treatment of psoriasis. Although phototherapy has been effective in the resolution of psoriatic plaques, it has traditionally required 25 to 30 treatment sessions to produce optimal results. In addition, higher fluences have been tried but were intolerable to healthy skin surrounding the plaque. Treatment utilizing phototherapy has evolved to incorporate the use of psoralen and narrowband UVB (NUVB) light in an attempt to minimize the number of treatments and exposure to harmful rays. Parrish and Jaenicke¹ demonstrated that psoriasis was best resolved by irradiation within the spectrum of 300 to 313 nm and that wavelengths less than 290 nm were ineffective.^{1,2} Until recently, 311-nm NUVB was thought to be the best option for clearing psoriatic plaques. Although the length of remission is unknown at this time, there are suggestions that this mode of therapy may be less carcinogenic than previously explored options. New evidence suggests, however, that the 308-nm xenon chloride (XeCl) excimer laser is more effective in

the clearing of plaques with fewer treatments and without the adverse effects on surrounding skin.

Two small-scale studies have been conducted to measure the efficacy of the 308-nm excimer laser. The first, by Bónis et al³ compared 311-nm NUVB phototherapy to the 308-nm XeCl excimer laser in 6 patients and evaluated its efficacy in 10 patients. The authors theorized that the laser, which operated within the same wavelength spectrum as NUVB, would have a similar benefit in the treatment of psoriasis with the added advantage of being able to direct treatment selectively to the involved psoriatic plaques. Patients underwent treatment 3 times weekly, starting with a mean of 54.6 light impulses, with each impulse lasting 15 ns and an energy of 5.5 mJ/cm² per impulse at a rate of 20 impulses per second.³ For each treatment, the dose was increased by 11 impulses, and the patients were treated until the plaque completely resolved. Patients required a mean of 8.33 treatments and received a mean cumulative dose of 4.81 J/cm² of irradiation. This is in contrast to the patients treated with NUVB who required a mean of 30.1 treatments and a mean cumulative dose of 31.1 J/cm² of irradiation before achieving complete clearance of plaques. The 308-nm excimer laser, therefore, required 6.47 times less irradiation and 3.6 times fewer treatments than 311-nm UVB phototherapy to achieve complete clearance. Follow-up after 2 years revealed that 8 of the 10 patients remained in remission.⁴

The second study, by Asawanonda et al,² was a dose-response study evaluating 13 patients for a total of 10 weeks to determine the optimal settings for the treatment of psoriasis. In this study, the minimal erythema dose (MED) was determined (mean MED was 203.03 mJ/cm²), and the treatment was administered in low (0.5–1 MED), medium (2, 3, 4, and 6 MEDs), and high (8 and 16 MEDs) fluences. The authors found that higher fluences produced significantly better results with

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as little as one treatment and fewer recurrences at 4 months' follow-up. The higher fluences, however, were associated with painful blistering eruptions. The authors were able to obtain similar resolution of plaques with repeated exposure to moderate doses of irradiation, with adverse effects limited to transient erythema. Repeated exposures to low fluences did not result in clearing. Asawanonda et al² concluded that fluence was the most important determinant of successful treatment of plaques and that the number of treatments was less pertinent. Even though repeated treatments were needed at moderate doses, the number of treatments and the cumulative amount of irradiation were much less than what would be required with traditional NUVB phototherapy.⁵

The 308-nm excimer laser offers many benefits over traditional NUVB phototherapy. The ability to efficiently treat psoriatic plaques with fewer treatments and a lower cumulative dose of irradiation is potentially invaluable. In addition, the ability to target specific plaques and spare the surrounding healthy skin will reduce carcinogenesis and photoaging effects typically encountered with conventional phototherapy and photochemotherapy. Although more studies will be needed to determine the optimal dosing and administration methods, the 308-nm excimer laser holds terrific promise as a future mainstay of treatment for psoriasis.

REFERENCES

1. Parrish JA, Jaenicke KF. Action spectrum for phototherapy of psoriasis. *J Invest Dermatol.* 1981;76:359-362.
2. Asawanonda P, Anderson R, Chang Y, et al. 308-nm Excimer laser for the treatment of psoriasis. *Arch Dermatol.* 2000;136:619-624.
3. Bónis B, Kemeny L, Dobozy A, et al. 308-nm UVB excimer laser for psoriasis [letter]. *Lancet.* 1997;350:1522.
4. Kemeny L, Bonis B, Dobozy A, et al. 308 nm excimer laser therapy for psoriasis. *Arch Dermatol.* 2001;137:95-96.
5. Walters IB, Burack LH, Coven TR, et al. Suberythemogenic narrow-band UVB is markedly more effective than conventional UVB in treatment of psoriasis vulgaris. *J Am Acad Dermatol.* 1999;40:893-900.